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USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK. VOLUME 113. MK-1 TES--ETC(U)
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USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK.

Volume 113.

MK-1 Test Stand, Aircraft Hydraulic System.

(9) Technical rept.,

(10) Nick A. Farinacci

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AEROSPACE MEDICAL RESEARCH LABORATORY
AEROSPACE MEDICAL DIVISION
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WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)* The MK-1 Hydraulic Test Stand is an electric motor-driven unit designed to test aircraft hydraulic systems. This report provides measured data defining the bioacoustic environments produced by this unit operating inside a large aircraft hanger at normal rated/loaded conditions. Near-field data are reported for 37 locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and		

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limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, "USAF Bioenvironmental Noise Data Handbook, Vol. 1: Organization, Content and Application", AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.

PREFACE

This report was prepared by the Biodynamic Environment Branch, Aerospace Medical Research Laboratory, under Project/Task 723104, Measurement and Prediction of Noise Environments of Air Force Operations.

The author acknowledges the efforts of Mr. Robert T. England and Mr. Robert G. Powell who conducted the field measurements, and Mr. John N. Cole who established the data analysis requirements and assisted in the preparation of this report. Mr. Henry Mohlman and Mr. David Eilerman of the University of Dayton assisted in the mechanics of data processing, and Mrs. Norma Peachey typed and prepared the graphics.

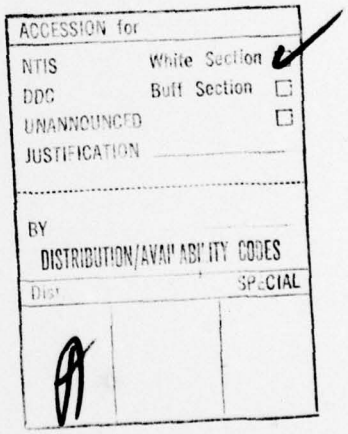

Table of Contents

List of Tables

List of Figures

INTRODUCTION

MK-1 Hydraulic Test Stand is an electric motor-driven unit designed to test aircraft hydraulic
ms.

volume provides measured data defining the bioacoustic environments produced by this unit. Such
are essential to evaluate ear protection requirements, limiting personnel exposure times, voice
nunication capabilities, and annoyance problems associated with operations of the MK-1 test stand.

volume is one of a series published by the Aerospace Medical Research Laboratory (AMRL) under
same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise
ronments produced at flight/ground crew locations and in surrounding communities by operations
Force aircraft and ground support equipment. The far-field, community-type, noise data in the
lbook describe the noise produced during *ground operations* of aircraft, ground support equipment,
other ground-based equipment or facilities.

ıme 1 of this handbook discusses the objectives and design of the handbook, the types of data
ented, measurement procedures, instrumentation, data processing, definitions of quantities, sym-
, equations, applications, limitations, etc. Volume 2 provides a method and data for adjusting the
lbook's far-field noise data, which are for standard meteorological conditions (15C temperature,
rel humidity, 0.760 meters Hg barometric pressure) to derive comparable data for other meteorolog-
conditions. *Refer to Volumes 1 and 2* (references 1 and 2) for such information because it is not
ated in other handbook volumes.

ımulative index lists those aerospace systems contained in the handbook, and identifies the specific
ımes containing each type of environmental noise data available (i.e., inflight/flight crew and
enger noise, near-field/ground crew noise, far-field/community noise). Volume numbers are as-
ıed sequentially as individual volumes are published. This index is periodically updated as indi-
ıal volumes are published, and is available upon request from AMRL/BBE, Wright-Patterson AFB,
45433. Organizations on the distribution list for the handbook will automatically receive a copy of
updated index as it is generated.

ect any questions concerning the technical data in this report and other handbook volumes to:
RL/BBE, Wright-Patterson AFB, OH 45433; Autovon 78-53675 or 78-53664; Commercial (513)
-3675 or (513) 255-3664.

Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and
plication*, AMRL-TR-75-50 (1), Aerospace Medical Research Laboratory, Wright-Patterson Air Force
e, Ohio, 1975.

Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 2: Procedure to Evaluate
cts of Non-standard Meteorological Conditions on Far-Field Noise*, AMRL-TR-75-50 (2), AMRL,
AFB, OH, 1975.

NEAR-FIELD NOISE

MEASUREMENTS

A standard MK-1 Test Stand was operated inside, and approximately in the center of a large aircraft hanger (167.6 m long × 36.6 m wide × 18.3 m high) on a concrete floor at a normal rated/loaded condition. The hanger walls and ceiling were not acoustically treated. No aircraft were in the vicinity of the unit while being measured. No far-field acoustic data were acquired because of the relatively close proximity of the hanger walls.

Figure 1 identifies 36 noise measurement locations at a height of 1.5 meters above the concrete apron (nominal ear level of ground crew). The 0 degree reference direction passes through the tow bar. These locations are in the acoustic near-field of the source where the sound wave fronts generally do not spherically diverge and the source appears to be spatially distributed (i.e., not a point source). Consequently, these near-field data cannot be extrapolated to longer distances but do properly define the levels at locations close to the unit.

Near-field measurements were also made at ear level at the operator control panel. Table 1 lists the numeric/alphabetic designators used on the data pages in this report to identify the operator measurement location and test conditions. The designator 1/A means operator location 1 and test condition A. Such a descriptor is essential in many handbook volumes that involve multiple combinations of locations/conditions. It is used in this report to maintain format consistency.

RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced by the MK-1 unit at the 37 specified, near-field locations. This table includes the overall, 1/3 octave band, and octave band levels. From these data one can calculate the variety of measures in Table 3 which are widely used to assess the effects of noise on personnel and their performance.

For data at other intermediate near-field locations (i.e., for radial distances less than 4 meters) you can interpolate between the 36 measured data points.

TABLE 1

MEASUREMENT LOCATION AND TEST CONDITION
FOR OPERATOR NOISE MEASUREMENTS

MK-1 Test Stand, Aircraft Hydraulic System
Wright Patterson AFB, 8 Nov 1972

Measurement Location	
1	Operator Control Panel
Operation	
A	System Pressurized

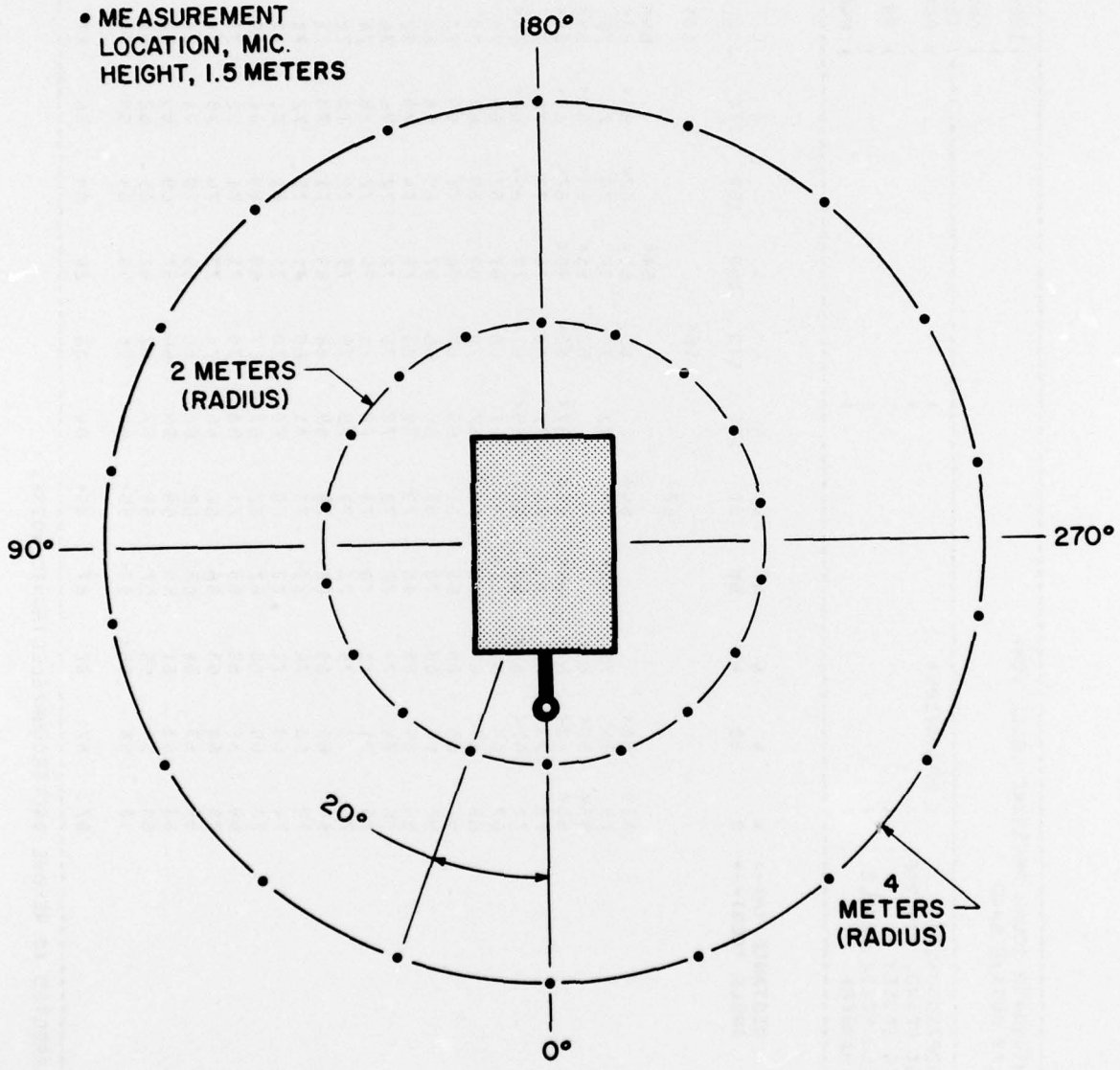

Figure 1. Measurement Locations

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-380
RUN 01
20 AUG 74
PAGE F1

NOISE SOURCE/SUBJECT:
MK-1 TEST STAND, AIRCRAFT HYDRAULIC SYSTEM NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION:

FREQ (HZ)	DISTANCE (M)-> 4	4	4	4	4	4	4	4	4	4	4	4	4
	ANGLE (DEG)--> 0	20	40	60	80	100	120	140	160	180	200	220	240
25							56<				58<		
31.5					63<								
40								64<			64<		
50	62<	60<			64<		65<	68<	62<	61<	63<	63<	62<
63	75	74	71	66<	77	71	79	80	75	74	75	77	75
80	59<	60<	60<				62<	61<	63<	63<	66<	60<	62<
100	66<	63<	67<	65<	66<	67<	62<	66<	67<	67<	66<	63<	64<
125	73	73	76	71	76	77	70<	74	77	78	74	66<	73
160	70	67<	66<	62<	66<	65<	67<	72	65<	68<	68<	68<	64<
200	67	69	68	64<	67	67	68	67	67	69	71	67	64<
250	68	67	67	66	66	67	70	69	69	67	70	66	64<
315	67	66	65	65	65	65	67	70	71	69	70	67	66
400	68	66	68	70	67	66	66	67	69	68	68	67	65
500	84	85	85	85	79	78	83	75	84	79	82	84	82
630	76	78	77	76	72	72	75	72	77	76	76	76	74
800	75	71	71	70	73	70	71	74	77	75	74	73	69
1000	75	73	75	73	77	75	75	75	72	78	72	78	70
1250	69	69	69	68	70	69	68	69	71	73	71	72	66
1600	72	68	74	70	70	71	69	71	75	72	71	72	69
2000	74	69	71	72	70	70	70	71	71	71	72	68	65
2500	70	66	68	67	67	67	67	69	69	68	69	68	66
3150	69	67	69	68	71	68	70	71	71	72	73	69	67
4000	70	68	68	66	67	66	70	73	74	75	74	71	68
5000	66	65	64	63	62	62	66	69	70	71	70	67	64
6300	63	63	61	59	59	59	64	67	69	69	67	64	63
8000	60	59	59	57	58	57	62	62	61	62	61	60	59
10000	58	58	56<	53<	55<	54<	58	59	58	59	58	57	55<
OVERALL	87	87	87	87	85	84	86	86	88	86	87	87	85

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND

IDENTIFICATION: OMEGA 3.2 TEST 71-020-380 RUN 02 20 AUG 74 PAGE F2

NOISE SOURCE/SUBJECT: MK-1 TEST STAND, AIRCRAFT HYDRAULIC SYSTEM NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION:

FREQ (HZ)	DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
	ANGLE (DEG) -->	260	280	300	320	340	0	20	40	60	80	100	120	140
25			61<	55<										
31.5														
40			59<											
50		64<	65<	62<		61<		60<	63<	65<	66<	67<	67<	63<
63		77	79	75	71	74	69	71	76	78	80	81	81	76
80		63<	63<	62<	61<	62<	64<	64<	60<	60<	60<	60<	61<	62<
100		64<	65<	63<	64<	65<	67<	66<	68<	66<	66<	67<	64<	67<
125		73	71	70<	71	68<	70<	73	76	76	75	79	72	76
160		65<	66<	64<	65<	64<	73	72	69	70	71	67<	67<	70
200		65<	65<	64<	65<	71	74	73	71	68	66<	68	72	72
250		64<	64<	64<	67	68	74	73	68	66	68	68	68	70
315		64	66	66	67	67	72	69	68	68	68	67	69	70
400		68	68	68	69	71	71	71	73	71	70	68	69	71
500		79	74	76	78	87	88	74	79	82	79	75	79	77
630		72	69	69	72	79	80	74	74	75	73	71	74	75
800		72	74	67	70	70	77	74	73	71	71	71	77	77
1000		68	74	67	77	74	81	79	78	70	80	74	79	82
1250		65	67	65	70	68	74	73	73	69	72	69	72	76
1600		68	65	71	72	75	77	75	73	72	73	72	72	75
2000		71	64	69	72	67	76	70	73	70	69	72	70	72
2500		65	63	65	68	66	72	71	70	71	67	68	68	73
3150		63	65	68	67	68	73	75	75	73	74	74	72	74
4000		66	67	69	69	69	76	75	73	71	70	69	70	75
5000		63	63	65	66	67	72	71	68	67	67	66	66	72
6300		62	61	63	63	64	69	68	67	65	64	64	65	69
8000		59	59	59	61	60	65	65	64	63	62	63	62	64
10000		55<	55<	56<	59	58	62	65	63	61	60	59	60	61
OVERALL		84	83	82	84	89	91	86	86	86	87	86	87	88

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB)
1/3 OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-380
RUN 03
20 AUG 74
PAGE F3

NOISE SOURCE/SUBJECT:
MK-1 TEST STAND, AIRCRAFT
HYDRAULIC SYSTEM
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:

FREQ (HZ)	DISTANCE (M)-> 2 ANGLE (DEG)--> 160	2 180	2 200	2 220	2 240	2 260	2 280	2 300	2 320	2 340	OPERATOR LOCATION TEST CONDITION 1/A
25		57<								56<	56<
31.5	64<	65<	63<	64<							
40											
50		62<	62<	65<	69<	69<	69<	68<	64<	60<	62<
63	63<	75	74	78	82	83	82	81	78	73	70
80	65<	67<	65<	64<	65<	65<	65<	65<	64<	65<	64<
100	71<	73	70<	65<	65<	65<	65<	68<	68<	68<	66<
125	81	84	82	75	72	72	72	76	77	74	71
160	72	73	72	69	67<	66<	68<	67<	70	71	72
200	75	76	76	76	71	69	67	68	73	73	69
250	75	76	75	72	68	68	68	66	70	73	70
315	74	77	74	72	70	67	67	67	68	72	71
400	72	74	72	72	72	71	71	72	71	72	76
500	85	87	84	72	74	81	72	81	82	86	81
630	81	83	81	72	70	74	70	74	75	78	75
800	81	81	79	75	75	75	73	73	73	73	74
1000	83	81	81	76	73	72	72	71	75	75	81
1250	78	77	76	73	69	67	67	67	70	73	74
1600	78	79	77	72	71	66	68	70	77	79	79
2000	76	76	76	74	70	68	67	70	71	75	76
2500	74	74	74	71	67	65	64	68	71	72	74
3150	79	79	76	72	69	72	71	70	72	77	78
4000	79	81	78	74	70	69	70	71	74	75	75
5000	75	77	75	71	67	67	67	67	70	71	70
6300	72	74	72	69	65	66	65	66	68	68	67
8000	67	68	66	64	62	63	62	63	64	65	66
10000	63	65	62	61	60	60	60	60	62	64	63
OVERALL	91	93	91	86	86	87	85	87	88	89	88

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 — MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-380
RUN 01
20 AUG 74
PAGE J1

NOISE SOURCE/SUBJECT:
MK-1 TEST STAND, AIRCRAFT HYDRAULIC SYSTEM NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION:

FREQ (HZ)	DISTANCE (M)-> / ANGLE (DEG)-->	4 / 0	4 / 20	4 / 40	4 / 60	4 / 80	4 / 100	4 / 120	4 / 140	4 / 160	4 / 180	4 / 200	4 / 220	4 / 240
31.5												65		
63		76	74	71		77		79	80	75	74	75	77	75
125		75	74	77	72	76	78	72	77	78	78	75	71	74
250		72	72	72	70	71	71	73	73	74	73	75	71	69
500		84	86	86	86	80	79	83	77	85	81	83	84	82
1000		78	76	77	75	79	77	77	78	79	80	77	80	73
2000		77	73	77	75	74	74	73	75	77	75	75	75	72
4000		73	71	72	71	72	71	74	76	77	77	77	74	71
8000		66	65	63	62	62	62	66	69	70	70	68	66	65
OVERALL		87	87	87	87	85	84	86	86	88	86	87	87	85

TABLE: 2 — MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-380
RUN 02
20 AUG 74
PAGE J2

NOISE SOURCE/SUBJECT:
MK-1 TEST STAND, AIRCRAFT
HYDRAULIC SYSTEM
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:

FREQ (HZ) / DISTANCE (M) -> / ANGLE (DEG) -->	4 260	4 280	4 300	4 320	4 340	2 0	2 20	2 40	2 60	2 80	2 100	2 120	2 140
31.5		63											
63	77	79	75	71	74	70	72	76	78	80	81	81	77
125	74	73	71	73	71	75	76	77	77	77	80	74	78
250	69	70	69	71	74	78	77	74	72	72	73	75	76
500	80	76	77	79	87	89	78	81	83	80	77	81	79
1000	74	77	71	78	76	83	81	80	74	81	77	81	84
2000	73	69	73	76	76	80	77	77	76	75	75	75	78
4000	69	70	72	72	73	79	79	78	76	76	76	75	78
8000	64	64	65	66	66	71	71	69	68	67	67	68	71
OVERALL	84	83	82	84	89	91	86	86	86	87	86	87	88

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-380
RUN 03
20 AUG 74
PAGE J3

NOISE SOURCE/SUBJECT:
MK-1 TEST STAND, AIRCRAFT HYDRAULIC SYSTEM NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION:

FREQ (HZ) / DISTANCE (M) -> / ANGLE (DEG) -->	2 160	2 180	2 200	2 220	2 240	2 260	2 280	2 300	2 320	2 340	OPERATOR LOCATION TEST CONDITION 1/A
31.5		66									
63	67	76	75	79	82	83	82	81	78	74	71
125	82	85	83	76	74	73	74	77	78	77	75
250	80	81	80	78	74	73	72	72	75	78	75
500	86	89	85	77	77	82	76	82	83	86	83
1000	86	85	84	80	78	77	76	75	78	78	82
2000	81	81	80	77	74	71	71	74	79	81	81
4000	83	84	81	77	73	75	74	74	77	79	80
8000	74	75	73	70	68	68	68	68	70	71	70
OVERALL	91	93	91	86	86	87	85	87	88	89	88

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-380
RUN 01
20 AUG 74
PAGE H1

NOISE SOURCE/SUBJECT:
MK-1 TEST STAND, AIRCRAFT
HYDRAULIC SYSTEM
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:

DISTANCE (M)->	4	4	4	4	4	4	4	4	4	4	4	4	4
ANGLE (DEG)-->	0	20	40	60	80	100	120	140	160	180	200	220	240
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	87	87	87	87	85	84	86	85	87	86	86	87	84
OASLA	85	84	85	84	83	82	83	83	85	85	84	85	82
T	404	480	404	480	571	679	571	571	404	404	480	404	679
MINIMUM QPL EAR MUFFS													
OASLA*	63	63	64	63	60	60	62	60	63	62	62	62	61
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	57	58	58	57	56	55	57	56	58	56	57	57	55
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	61	61	61	61	58	57	60	57	61	60	60	61	58
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	46	46	46	45	44	43	45	44	46	46	45	47	43
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	56	53	55	53	55	54	54	55	56	57	55	56	52
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	80	78	80	79	78	77	78	77	80	79	79	80	76
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	101	101	100	99	98	96	100	99	101	100	101	101	98
C	4	5	3	3	3	3	4	2	4	2	3	4	4

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: MEASURES OF HUMAN NOISE EXPOSURE

3

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-380
RUN 02
20 AUG 74
PAGE H2

NOISE SOURCE/SUBJECT:
MK-1 TEST STAND, AIRCRAFT
HYDRAULIC SYSTEM
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:

DISTANCE (M)->	4	4	4	4	4	2	2	2	2	2	2	2	2
ANGLE (DEG)-->	260	280	300	320	340	0	20	40	60	80	100	120	140
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	84	83	82	84	88	91	86	86	86	86	86	87	88
OASLA	81	80	80	83	86	89	85	85	83	84	82	84	87
T	807	960	960	571	339	202	404	404	571	480	679	480	285
MINIMUM QPL EAR MUFFS													
OASLA*	60	58	57	59	65	66	61	62	62	61	62	61	62
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	55	54	53	54	59	61	55	57	57	57	58	57	57
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	57	56	54	58	63	65	59	59	59	59	56	60	62
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	42	42	39	44	47	50	46	46	44	46	43	46	48
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	52	53	51	55	54	59	58	58	55	57	56	57	60
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	76	74	74	78	80	84	79	79	78	79	76	79	80
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	96	94	95	97	101	105	100	100	100	100	99	99	101
C	3	2	2	3	3	4	2	2	3	3	2	3	2

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION: OMEGA 3.2 TEST 71-020-380 RUN 03 20 AUG 74 PAGE H3

NOISE SOURCE/SUBJECT: MK-1 TEST STAND, AIRCRAFT HYDRAULIC SYSTEM NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION:

DISTANCE (M) ->	2	2	2	2	2	2	2	2	2	2	OPERATOR LOCATION
ANGLE (DEG) -->	160	180	200	220	240	260	280	300	320	340	TEST CONDITION
											1/A
HAZARD/PROTECTION											
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR											
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR											
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)											
NO PROTECTION											
OASLC	91	93	90	86	85	87	85	86	87	89	88
OASLA	90	91	89	84	82	83	81	83	85	88	88
T	170	143	202	480	679	571	807	571	404	240	240
MINIMUM QPL EAR MUFFS											
OASLA*	67	69	66	61	60	62	60	62	63	65	63
T	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS											
OASLA*	61	63	61	57	57	58	57	58	58	59	57
T	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS											
OASLA*	65	66	64	58	57	59	56	59	60	63	62
T	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS											
OASLA*	51	51	50	45	43	45	43	44	46	47	48
T	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT											
OASLA*	62	62	61	57	55	55	54	55	57	59	60
T	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION											
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)											
PSIL	84	85	83	78	76	77	74	77	80	82	82
ANNOYANCE											
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)											
TONE CORRECTION (C IN DB)											
PNLT	105	107	104	99	96	99	96	98	101	104	103
C	3	3	2	1	1	3	1	3	3	4	2

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

*U.S.Government Printing Office: 1977 — 757-080/260